Response of Yearling Steers to Burning, Fertilization, and Intensive Early Season Stocking of Bluestem Pasture[1]

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Summary

Four hundred ninety-two acres of native bluestem range were divided into nine pastures for summer grazing by yearling steers. Five pastures were burned April 28; four were not burned. Burned and not burned pastures were treated with 0, 40, or 80 lbs. of nitrogen per acre applied aerially as granular urea. Stocking rates were determined from previous work on herbage production from experimental plots under similar treatments. Both average daily gains and weight gains per acre were greater from each burned treatment than from not burned treatments with similar fertilization and stocking rate. Steers grazing an early-season-stocked pasture intensively for 76 days produced the highest average daily gain of 1.72 lbs. Highest gains per acre (137 lbs.) were on the burned pasture that received 80 lbs. of nitrogen per acre.

Introduction

Previous research has indicated that nitrogen fertilization of range grasses increases herbage yields, possibly improves forage quality, and thus, improves animal performance. Fertilizing bluestem pastures with nitrogen contributes to an unfavorable herbage composition shift towards cool-season species and some weeds. Range-burning studies have shown annual late spring burning (about May l), coupled with moderate stocking, increases steer gains and improves range condition over unburned range stocked at the same rate. In addition, burning essentially eliminates such less productive, cool season species as Kentucky bluegrass. We studied effects from incorporating burning and fertilizing to see if beef yields would be significantly increased with no detrimental effects to range condition. We also studied effects of early-season intensive stocking on both vegetation and cattle.

[1]The following cooperated in making this study possible: Willchemco Inc., Tulsa, Okla.; Erhart Spraying Ser., Inc., Lawrence, Kansas; C. K. Processing Co., Manhattan, Kansas; Peddicord Feedlot Inc., Wamego, Kansas.

Experimental Procedure

We used native bluestem pasture at the Kansas State University Range Research Unit near Manhattan: six pastures of 60 acres each and three of 44 acres each. The experimental treatments are described in Table 1. One nonburned, non-fertilized pasture and one burned, nonfertilized pasture were retained from previous studies to observe long time effects of burning, especially on vegetation. Those two pastures have been used 23 years for studies. Burned pastures were burned April 28, 1972. Nitrogen was applied May 17 in the form of urea granules, 45% nitrogen. Urea cost $69/ton plus $1 an acre and 2 cents a pound for aerial application. The pastures were stocked from May 2 to October 3, 1972, except the early-season intensely-stocked pasture was grazed only from May 2 to July 15, 1972. Angus steers used to stock the pastures were purchased in March at 345 pounds each and fed silage, alfalfa, and grain until May 2 when they averaged 402 pounds. The steers were gathered the first of each month, penned overnight without feed or water, and weighed the next morning.

Results

Late spring burning increased daily gain and gain per acre (Table 1). Forty pounds of nitrogen per acre seemed to increase daily gain, but 80 pounds per acre did not, but both rates increased gain per acre. Gain per acre was 43 pounds more from burned pastures with 40 pounds of nitrogen applied, and 81 pounds more with 80 pounds of nitrogen applied than from unfertilized pasture.

Highest daily gain was on the pasture stocked intensely 76 days (May 2 to July 15). More gain was produced by stocking a pasture at twice normal rate early in the growing season than at moderate rate the entire season.

Table 1. Steer gains on bluestem pasture, May 2 to October 3 (155 days) - 1972

	Daily gain per steer, lbs,	Gain per acre,lbs.	Acres per steer
Not burned			
No nitrogen, same treatment 23 years	1.15	53	3.3
No nitrogen	0.84	39	3.3
40# nitrogen per acre	0.99	68	2.2
80# nitrogen per acre	0.77	84	1.4
Burned April 28, 1972			
No nitrogen, same treatment 23 years	1.44	70	3.1
No nitrogen	l.23	56	3.3
40# nitrogen per acre	1.42	99	2.2
80# nitrogen per acre	1.27	137	1.4
Intensely stocked early 76 days, May 2 to July 15	1.72	79	1.7